

*FROM THE LABORATORY TO COMMUNITY
APPLICATION: TRANSLATIONAL RESEARCH IN
BEHAVIOR ANALYSIS*

DOROTHEA C. LERMAN

LOUISIANA STATE UNIVERSITY

Basic findings on the principles of learning have served as the foundation for research and practice in applied behavior analysis since the inception of the field. As such, most if not all of the research that appears in the *Journal of Applied Behavior Analysis (JABA)* could be considered “translational,” an increasingly popular term in the biomedical and behavioral sciences to describe collaborative lines of basic and applied research. A number of articles and special sections in *JABA* reflect a growing interest in more highly organized collaborations of this sort. For example, abstracts from the *Journal of the Experimental Analysis of Behavior* have appeared periodically in a section entitled “Development of Basic Research and Their Potential Applications,” a special issue entitled “Integrating Basic and Applied Research” was published in 1994, and review papers on basic findings in areas relevant to clinical application (e.g., choice, extinction, delayed reinforcement) have been published over the last decade (e.g., Fisher & Mazur, 1997; Lerman & Iwata, 1996; Stromer, McComas, & Rehfeldt, 2000).

Various types of applied research are necessary to translate basic knowledge into state-of-the-art clinical practices for use in community settings. Among other things, programmatic lines of research should involve studies that (a) bridge basic and applied work on factors relevant to clinical practice, (b) evaluate variables or procedural refinements to promote the transfer of research-based technologies into community

settings, and (c) demonstrate the application of these technologies by practitioners, parents, and teachers as part of routine service provision. The field would benefit from more direct collaboration between basic and applied researchers in establishing these lines of research. The papers selected for this special issue illustrate the range of studies relevant to translational research and highlight the field’s potential contribution to the growing emphasis on this type of collaborative work in the behavioral sciences.

TRANSLATING BASIC FINDINGS
INTO EFFECTIVE CLINICAL
INTERVENTION

Translational research often begins when findings from the laboratory are replicated with and extended to clinical populations and problems. If these initial extensions yield promising results, additional research typically is needed to further explore basic process and to develop and refine effective technologies. Basic findings directly inform the methodologies, interventions, and data analysis at this stage of translational research, and one or more of the key distinguishing features of applied work usually are absent from these studies (Baer, Wolf, & Risley, 1968). For example, the study may be conducted in a laboratory-type setting instead of the usual social context to obtain a high degree of control over the variables of interest, or it may focus on responses that are convenient to study (e.g., arbitrary responses) rather than on behavior that would be the target of treatment (e.g., problem behavior). A number of papers in this issue illustrate this stage of translational research.

Address correspondence to the author at the Psychology Department, 236 Audubon Hall, Louisiana State University, Baton Rouge, Louisiana 70803.

Building Bridges to Technology

Review papers that highlight findings from the basic literature and that precisely delineate links between basic findings and application may be especially useful for promoting initial collaborative work in a given area. A discussion paper on reinforcer value by Murphy, McSweeney, Smith, and McComas illustrates the critically important role that such papers can play in the early stages of translational research. The authors describe how results of basic studies on within-session response patterns and phenomena known as "sensitization" and "habituation" could have important implications for the effective use of reinforcers in clinical contexts.

The study by Ahearn, Clark, Gardenier, Chung, and Dube is characteristic of early translational research in a given area. A number of basic studies have demonstrated a positive relation between reinforcer rate and response persistence. The purpose of this study was to evaluate this relation in the context of a commonly used treatment for stereotypic behavior in children with autism. Relatively brief sessions and a laboratory-type setting were used to determine if further applied research on reinforcement rate and response persistence should be pursued. The level of stereotypic behavior immediately after a period of access to preferred items was compared to the level immediately after a period without access. Although this comparison was conducted just three to five times for each participant, results suggested that exposure to preferred items increased the persistence of stereotypic behavior. Additional research is now needed to explore the clinical implications of these findings.

The methods or results of basic studies also may be extended to clinical populations outside the context of treatment for the primary purpose of delineating basic relations or understanding factors that may influence

socially relevant behavior. Dixon, Marley, and Jacobs extended basic research on choice and delay discounting to examine variables that might be related to pathological gambling, a problem that has not yet been studied in applied behavior-analytic research. The extent to which gamblers versus control participants preferred a smaller immediate reward over a larger delayed reward was determined within the context of a hypothetical money choice task. Results suggested that pathological gamblers undervalued the delayed reward to a greater degree than did individuals who did not gamble. The money choice task facilitated this early stage of translational research by providing a convenient and efficient way to measure discounting. The intriguing findings now invite further research on directly observable aspects of delay discounting and pathological gambling.

Doepke, Henderson, and Critchfield also sought to replicate and extend basic findings on a socially important behavior that has not yet been studied using a behavior-analytic approach. The authors evaluated the effects of two antecedents on the accuracy of eyewitness testimony in children following a simulated health-check situation. A reversal design was used to examine the relation between the accuracy of the child's answers to questions about the health check and two factors that have been the focus of group-design research on eyewitness testimony. The findings suggest that the concepts and methods of behavior analysis would be useful for advancing knowledge about factors that influence eyewitness testimony and for developing interventions to improve the accuracy of recall.

In a similar type of translational study, Critchfield, Haley, Sabo, Colbert, and Macropoulis employed basic methods and findings on fixed-interval schedule performance to understand factors that may influence the legislative productivity of the U.S. Congress.

The authors, who extended an analysis conducted by Weisberg and Waldrop (1972), found that the cumulative number of monthly bills passed each legislative session across a 52-year period consistently resembled the scalloped pattern of responding under fixed-interval schedules. Laboratory findings were used to identify additional similarities between the pattern of bill passage and fixed-interval performance. These results offer some insight into factors that may influence legislative productivity. The knowledge obtained from this type of research could lead to important social change on a broad scale.

*From the Laboratory to Technology:
Advancing Clinical Practice*

A primary goal of translational research in a given area is to study relations and basic processes that will lead to effective clinical interventions. To accomplish this goal, further research typically is needed to evaluate the efficacy of interventions derived from basic findings and to explore the applicability of these treatments. For example, results of basic studies have shown that performance on delayed matching tasks will improve if the participants orally name the sample prior to matching. Gutowski and Stromer conducted a study to determine if these effects could be replicated with more complex, naturalistic matching tasks (two-element stimuli involving common objects rather than abstract forms) and with dictated names as well as with pictures. Results showed that participants' performance improved when they were prompted to name or repeat the samples. This intervention may be useful in a variety of learning situations that require recall of previously presented stimuli.

Integrating basic and applied research from multiple areas may be especially useful for studying basic process and refining educational interventions. A study by Carr on teaching auditory-visual conditional discrim-

inations illustrates this approach to translational research. Carr integrated and extended basic findings on exclusion-based learning, fast mapping, and relational frame theory to teach word-item relations to children with autism and several language disabilities. Results indicate that Carr developed an effective strategy for teaching children how to learn word-item relations via exclusion (i.e., to correctly select named objects by excluding objects with known names).

Roscoe, Iwata, and Rand evaluated the effects of reinforcement magnitude on the rate of responding under contingent reinforcement and noncontingent reinforcement (NCR) arrangements to further clarify the role of this factor in NCR treatments and to reconcile previous findings in the literature. This study illustrates the advantages of using arbitrary responses (e.g., switch presses rather than self-injury) and quantifiable reinforcers (e.g., food rather than attention or escape) to conduct complex, parametric analyses of reinforcement dimensions. Results showed a negative relation between magnitude and response rates, even when reinforcer consumption time was taken into consideration. These findings have direct implications for the use of NCR as treatment for behavior disorders.

Simmons, Smith, and Kliethermes also drew on basic procedures (multiple schedules; a laboratory setting) to study the effects of an NCR treatment that is commonly used for problem behavior maintained by automatic reinforcement. Levels of mouthing before, during, and after exposure to fixed-time reinforcement schedules (i.e., access to food) were compared to determine if treatment effects would persist at least briefly after the termination of food delivery. In addition, response patterns were examined to identify possible mechanisms that underlie the behavior disorder and the effectiveness of treatment.

TRANSLATING RESEARCH INTO PRACTICE

Strategies to promote the transfer of treatments to community settings must be evaluated after effective technologies are developed on the basis of studies that bridge basic and applied work. Studies on training and consultation, procedural refinements to commonly used treatments, and the long-term outcome of clinical application are conducted in this stage of translational research, as illustrated by another group of studies in this issue.

Training and Consultation Models

The voluminous training literature indicates that parents, teachers, and staff can learn to implement a variety of interventions with a high degree of accuracy. Yet, further research is needed to refine current approaches to training and consultation and to evaluate the long-term effectiveness of training procedures. Mueller et al. accomplished several of these goals while training parents to implement treatments for their children's feeding problems. Results showed that a multicomponent training package produced a high degree of treatment integrity that persisted across time and generalized to naturalistic settings (homes). Component analyses also were conducted with parents to identify the necessary and sufficient components of the training package.

Mueller, Edwards, and Trahant evaluated a model for transferring research findings on functional analysis and treatment of behavior disorders into regular and special education classrooms. The consultation model incorporated functional analyses of problem behavior, brief treatment comparisons, and assessments of teacher acceptability to identify effective interventions for problem behavior maintained by escape from demands. With the assistance of a consultant, teachers in three classrooms successfully employed

state-of-the-art technologies for the selection and design of treatments.

The transfer of research-based interventions into community settings requires not only effective training strategies but also procedures to ensure that staff will continue to use the interventions as part of routine service provision. Reid, Green, and Parsons demonstrated an efficient approach to training and supervision that produces high program integrity and durable outcomes. Job coaches were taught how to provide more choices to workers with severe cognitive and physical disabilities in a supported work situation. Results showed substantial increases in choice-making opportunities across a 1-year period.

Practical Considerations

Highly effective treatments developed and tested under laboratory conditions may be less successful when transferred into naturalistic settings, especially if the treatment must be modified to make it more practical for clinical use. As such, research on the initial application of new treatments in community settings is a critical component of translational research. Roane, Kelly, and Fisher evaluated the effects of providing noncontingent access to competing stimuli (food) on levels of mouthing across three naturalistic settings. The food items were placed in a fanny pack that the participant wore around his waist. Results showed that the treatment was effective in reducing the behavior outside a laboratory setting.

Long-Term Outcomes

Studies on the long-term efficacy of clinical practices that have been transferred into the community are conducted during an important, final phase of translational research. This research often takes the form of outcome studies with large numbers of subjects and may rely on indirect measures of the dependent variable, as illustrated in a study

conducted by Putnam, Handler, Ramirez-Platt, and Luiselli. The effect of a school-wide intervention to decrease disruption on school buses was evaluated across 3 consecutive years by collecting data on the number of office referrals and bus suspensions received by students for disruptive behavior on the school bus. Results showed that the intervention remained effective over the long run and that school personnel continued to implement the treatment after the authors had discontinued contact with the school.

REFERENCES

- Baer, D. M., Wolf, M. M., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis*, 1, 91-97.
- Fisher, W. W., & Mazur, J. E. (1997). Basic and applied research on choice responding. *Journal of Applied Behavior Analysis*, 30, 387-410.
- Lerman, D. C., & Iwata, B. A. (1996). Developing a technology for the use of operant extinction in clinical settings: An examination of basic and applied research. *Journal of Applied Behavior Analysis*, 29, 345-382.
- Stromer, R., McComas, J. J., & Rehfeldt, R. A. (2000). Designing interventions that include delayed reinforcement: Implications of recent laboratory research. *Journal of Applied Behavior Analysis*, 33, 359-371.
- Weisberg, P., & Waldrop, P. B. (1972). Fixed-interval work habits of Congress. *Journal of Applied Behavior Analysis*, 5, 93-97.

Received August 19, 2003

Final acceptance September 25, 2003

Action Editor, Wayne Fisher